



# **AEX Project**

**(Automating Equipment Information eXchange)**

## **Initial Results from Trying to Leverage the Success of Others**

**NIST/SIMA eBusiness Standards Workshop**  
**May 29, 2003**



# Outline

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- **Overview of FIATECH and AEX project**
- **Search for common solutions**
- **Needs and priorities for this workshop**

FIATECH



# FIATECH

... a collaborative organization to accelerate integration and automation of major capital facilities projects

- **Fully Integrated and Automated TECHnology for the capital facilities industry**
- Industry-led, collaborative, nonprofit, research consortium
- Owners, engineering and construction organizations and suppliers
- Established in July 2000
- Research, development & **deployment**
- Developed Capital Facilities Technology Roadmap
  - framework for FIATECH projects

FIATECH



# FIATECH Members

... a mix of Owners, EPCs, Suppliers and Research Organizations

**Abbott Labs**  
**Aspen Technology**  
**AVEVA, Inc.**  
**B E & K**  
**Bechtel**  
**Bentley Systems**  
**BNFL Engineering, Inc.**  
**Burns and Roe Enterprises**  
**CERL, U.S. Army Corp of Engin.**  
**CH2M Hill**  
**ChevronTexaco**  
**Citadon**  
**Daratech**  
**Day & Zimmermann International**  
**Dick Corporation**  
**The Dow Chemical Company**  
**E.I. DuPont de Nemours**  
**ePlantData**  
**Fluor Corporation**  
**Impress Software**

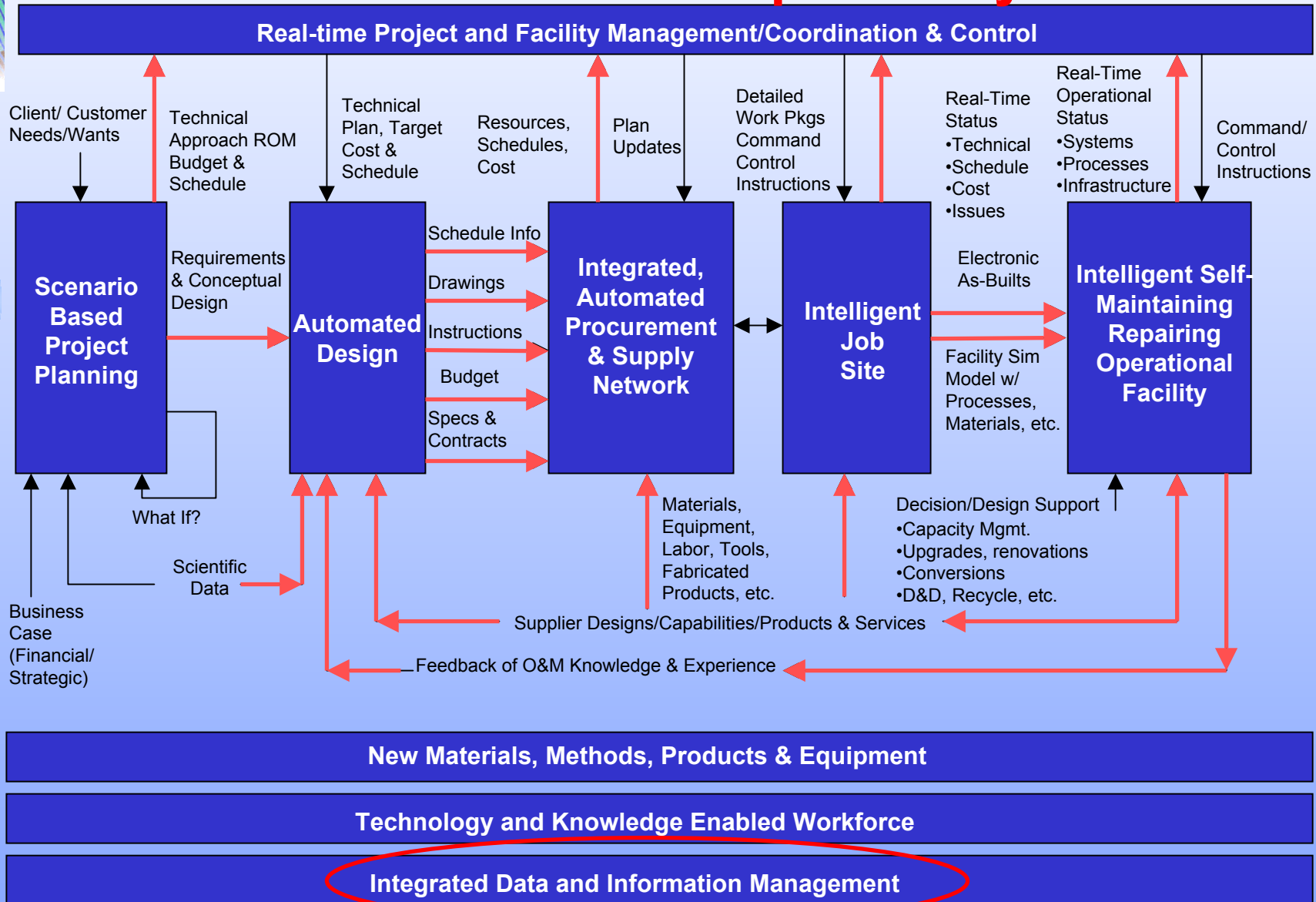
**Intel**  
**Intergraph**  
**Jacobs Engineering Group**  
**Lean Construction Institute**  
**Merck & Co.**  
**NASA**  
**National Research Council of Canada**  
**NIST/Building & Fire Research Lab**  
**Pantellos Group Ltd**  
**Parsons Energy & Chemicals**  
**Primavera Systems**  
**Reality Capture Technologies**  
**Rohm and Haas Company**  
**Saudi Aramco / Aramco Services**  
**S&B Engineering**  
**Smithsonian Institute**  
**Skire**  
**Stanford - CIFE**  
**Time Industrial**  
**Virginia Tech**  
**Zachry Construction**



FIATECH

# FIATECH Vision

## AEX Focus - Interoperability





# AEX Project

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## Objective

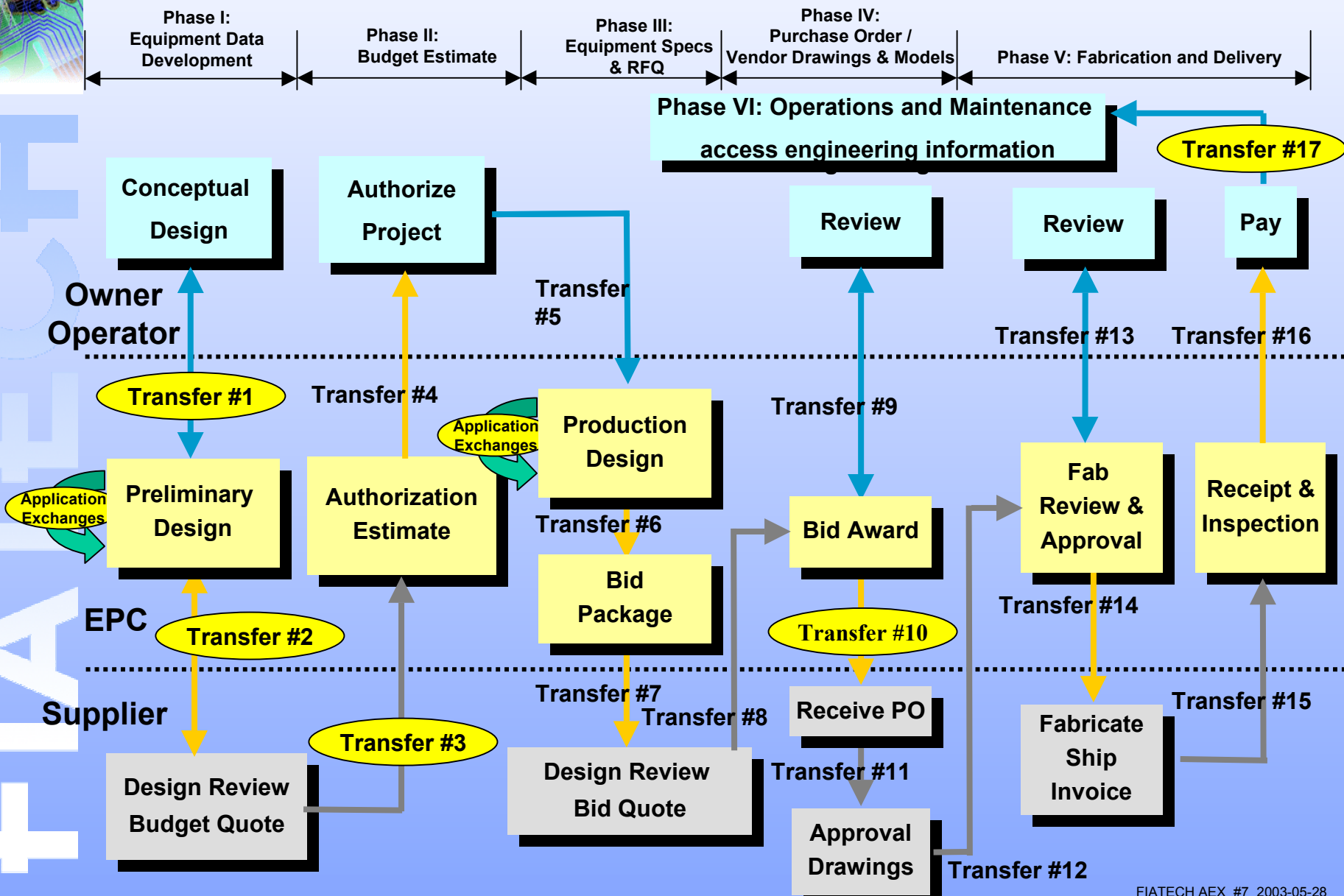
- Automate equipment design and delivery work processes through software interoperability

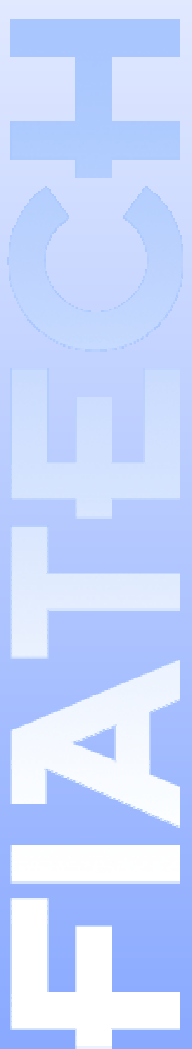
## Approach

- Focus on high benefit problems
- Develop practical analysis & development methodology
- Build on proven specs of leading industries
  - transport, routing, packaging, envelope, purchase order,...
- Focus on semantics of payloads for automating equipment life cycle processes
- Schemas available on “royalty free” basis
- Promote broad industry acceptance & adoption



# Equipment Life Cycle Work Process







# Review of eBus Frameworks and Specs

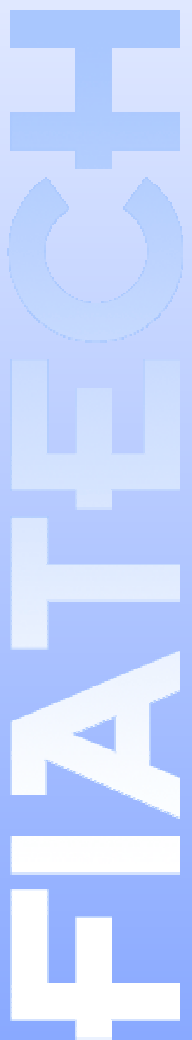
## (incomplete)

	CF Domain Specific Work				Envelope and Business Process (“Horizontal”) Work			
Organization	FIATECH	PIDX	ePlantData	PDAC	OASIS	IBM/Microsoft	Open Applications Group	UCC/RosettaNet
Specification	AEX	ComProServ <sup>i</sup>	PlantData XML	pdXML <sup>ii</sup>	ebXML <sup>iii</sup> UBL	BPEL4WS <sup>iv</sup>	OAGIS <sup>v</sup>	Note: Vertical and Horizontal Specs Partner Interface Processes, PIP <sup>vi</sup>
Defines Transactions	In process	Yes	In process	No	Yes		Yes	Yes
	RFQ Quote PO AsMfg BOM	QuoteRequest Quote OrderCreate	RFQ Quote PO AsMfg BOM				RequestForQuote Quote PurchaseOrder ?? BillOfMaterial	PIP3A1: Request Quote PIP3A2: PIP3A4:
Transport					HTTP(S)/SMTP SOAP	HTTP(S)/SMTP SOAP	Uses other envelope / transport (i.e. ebXML)	HTTP(S)/SMTP RNIF
Envelope	No	Yes	No	Yes	SOAP-ENV	From, To, Process	BusinessObjectDocument:: ApplicationArea	FromRole, toRole
Has core components	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Has transaction components	No	Yes	No	No	Yes	Yes	Yes	Yes
Payload	Yes	Yes	Yes	only	SOAP-BODY	Containers	DataArea	Quote.QuoteLineItem.DocumentReference
Core components identified	EngDoc, EquipItem, Mtrl, ProcDef, Stream	Attachment	EngDoc, EquipItem, Mtrl, ProcDef, Stream	PlantItem				
Common horizontal data <sup>vii</sup>	Dx, Ctx, Geom	PartnerInformation JobLocationInfo TaxInformation Location Contact	Dx, Ctx, Geom	Project, ProjectData BusinessUnit, ContactPerson				
Domain specific content	Yes CentrifPump Heat Exch	Yes Well-bore and cementing	Yes Heat Exch	Yes Heat Exch.	No	No	No	No
Element Modeling styles <sup>viii</sup>	“Venetian blind”	“Salami slice”	“Venetian blind”	“Salami slice”				
What is “data sheet” element	EngDoc	None	EngDoc	PlantItem	<None defined>	??	Attachments.DataSheet	<None defined>
What element contains data sheet	Dx	Pidx:Attachment. AttachmentLocation points to it	Dx	Top level element: pdXML_HeatExchanger	Attachment	Containers	Attachments	QuoteLineItemType.ProductIdentification can be a reference to data sheet
XMLSchema style guide	Yes	Yes	Yes	No				



# Observations from Initial Work

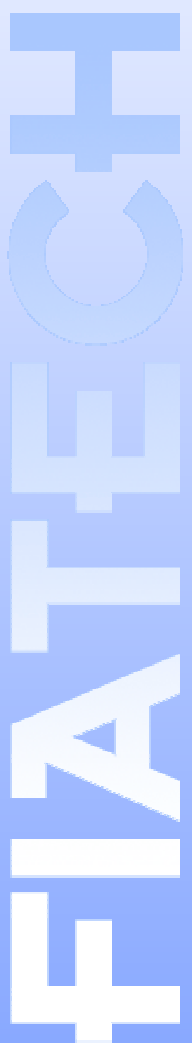
- **Multiple, overlapping eBus standards efforts**
  - Common objectives but minimal coordination
  - No comprehensive mechanisms for knowing what is available or should be considered for reuse or extension
- **Conflicting messages to industry**
  - Still waiting for ebXML core components
  - If eBus leaders not agreed, other industries are hesitant to invest
- **XML schema technology & eBus architecture appear incomplete and in transition**
  - Data models vs. document structures
  - Principles, processes and metrics for developing, validating and deploying schemas and core components in flux
    - Still an art versus a science and conflicting guidelines
    - Need for “business friendly” guidance
  - Due to these conditions, AEX Project produced “XML Schema Development Guidelines”
    - for consistent & coordinated development among related activities



# AEX Insights and Next Steps

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- **Important to understand multiple uses of equipment information over the life cycle**
  - engineering, procurement, simulation, reliability, operations, maintenance...
  - include all stakeholders in the supply chain
- **Essential to converge/leverage vs. re-invent**
  - schemas for units, materials, equipment, project, location...
- **Build on cross-industry solutions**
  - common “PO” and “envelope” structures
- **Will conduct trial use of OAG BODs and UBL for pump PO**



# Recommendations for this Workshop

- **Agree to work on common:**
  - **conceptual model for eBus architecture**
  - **eBus roadmap for industry adaptation**
  - **principles for aligning & converging efforts**
- **Define key barriers and solutions for industry adoption and deployment**
- **Start work on a plan for converging and initial areas for immediate convergence**
- **Leverage NIST where essential**